

UPDATES ON PAIRING ISSUES WITH THE US ANTARCTIC METEORITE COLLECTION.

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Introduction: The US Antarctic meteorite program has recovered >21,000 meteorites since 1976, with thousands of those recovered from several icefields over multiple seasons, sometimes spanning over a decade [1]. Pairing is assigned as best as possible at the time of classification, based on information from the field team, macro-scale hand sample features in the lab, and petrography, but later focused studies can reveal details that suggest re-evaluation of pairing groups. As a result, pairing groups are revealed over time, and must be continuously updated. Here we examine a few groups with known issues and give an update on some of the larger or more significant pairing groups.

Pairing Groups of non-EOC: Elephant Moraine (EET) region was visited six times between 1979 and 1999, leading to the establishment of two large carbonaceous chondrite pairing groups, EET 87507 CK5 (49) and EET 87711 CR chondrites (50). Similarly, the Miller Range (MIL) area was visited 8 times between 1985 and 2013 [2], yielding a number of interesting groups, including CM (28), CV (40), and CO (~200) chondrites and diogenites (~12). The Meteorite Hills (MET) area yielded many low grade ordinary chondrites, in the 1996, 2000, and 2001 seasons. And finally, the EET and Lewis Cliffs Ice Tongue (LEW) also yielded initially large pairing groups of low grade ordinary chondrites; detailed studies identified a few members of these groups that are primitive and distinct. For the latter three areas, we present new data for Cr contents of olivine (e.g., [3] and J.N. Grossman, pers. comm.) in many members of the pairing groups in an effort to identify additional primitive members.

Showers/strewnfields: Large showers and strewnfields resulting from impact or post impact redistribution on the ice surface can be comprised of as many as ~2000 specimens such as the QUE L/LL strewnfield [4] or as small as ~80 such as the Otway Glacier pairing group in the Grosvenor Range (GRO). A large number of L6 chondrites have been recovered from the Elephant Moraine Icefields indicating possibly a significant shower over a large area. Collection efforts in the Dominion Range (DOM) have revealed an enormous number of LL chondrites undoubtedly paired and skewing the statistics of that region. Efforts to more quickly identify these DOM members can be made using magnetic susceptibility Log χ values (10^{-9} m³/kg) which for LL chondrites are from 3.9 to 4.7.

Results: Accurate establishment of pairing is sometimes not easy, but has resulted in large mass pairing groups of other scientifically valuable meteorites such as CV, CO, CK, CM chondrites, as well as lunar basalt (LAP), nakhlite (MIL), howardite (EET) [5], and eucrite (ALH). Establishing pairing groups of primitive chondrites has resulted in nearly 1 kg of available material for some very primitive OC chondrites - a very valuable and plentiful scientific resource.

References: [1] Corrigan, C.M. et al. 2014. Spec. Publ. 68, AGU, 173-187. [2] Harvey, R.P. et al. 2014. Spec. Publ. 68, AGU, 23-41. [3] Grossman, J.N. and Brearley, A. 2005. MaPS 40, 87-122. [4] Welten, K. et al. 2011. MaPS 46, 177-196. [5] Buchanan, P.W. et al. 2000. *LPI Contributions*, 997, 21.